MOTOR EXAMINATION-CNS

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INSPECTION AND PALPATION OF MUSCLES

- Requires full exposure of muscles.
- Look for asymmetry, inspecting both proximally and distally.
- Note any deformities.
- Examine specially for wasting or hypertrophy, fasciculation and involuntary movement.
- Palpate muscles to assess their bulk.

Types of muscle wasting:

- Generalized wasting
- Proximal muscle wasting
- Distal muscle wasting

Common abnormalities

- **1. Muscle bulk** :
- Lower motor neuron lesions cause wasting in specific muscles.
- Upper motor neuron damage can cause disuse atrophy of muscle groups.
- Certain occupation and sports leads to muscle hypertrophy.
- The wasting of muscle is associated with diseases like rheumatoid arthritis, cachexia.

2. **Fasciculation:** Looks likes irregular twitches under the skin overlying muscles at rest commonly seen in LMN lesions.

3. **Myclonic jerk:** It is the sudden shock like contractions of one or more muscles. - Associated with epilepsy, diffuse brain damage and dementias .

4. Tremor:

is oscillatory movement about a joint or a group of joints resulting from alternating contraction and relaxation of muscles.

- Common Types

i. Physiological tremor :- hyperthyroidism, alcoholism.

ii. Coarse tremor (slow) :-Parkinson's disease.

iii. Intention tremor :- Cerebellar damage.

ASSESSMENT OF TONES

Tone:

is the resistance felt by the examiner when moving a joint passively through its range of movement.

- Site to check the tone:
- Upper Extremities - wrist and elbow joint
- Lower Extremities - knee level, ankle joint.
- Common abnormalities: Muscle tone may be decreased (Hypotonia) or increased (hypertonia).

- **Hypotonia** :

  is decreased tone and usually associated with muscle wasting, weakness and hyporeflexia.
- Cause : breach in the reflex arc,cerebellar disease, spinal shock.

- **Hypertonia** **:** There are two principal types hypertonia

  1.Spasticity

  2.Rigidity

Spasticity : means increased tone throughout range of motion, and then there is a sudden release (catch): so called '***clasp knife effect***'

- Seen in UMN lesion, pyramidal pathway lesion.
- In second type, there is equal resistance in both agonist and antagonists at any point: so called '***plastic or lead-pipe rigidity***'.
- Seen in extra-pyramidal system.
- Spasticity is velocity dependent(sudden release).

- **Rigidity** : increased tone throughout the range of motion.
- The agonist and antagonist contract alternately, rapidly : so called '*cog-wheel rigidity*'.
- seen in extra pyramidal diseases such as Parkinson's disease.
- Rigidity is not velocity dependent (continuous) .

EXAMINATION OF REFLEXES

Reflexes

1. **SUPERFICIAL REFLEXES**
2. **DEEP TENDON REFLEXES**

SUPERFICIAL REFLEXES - elicited by striking skin or mucous membrane.

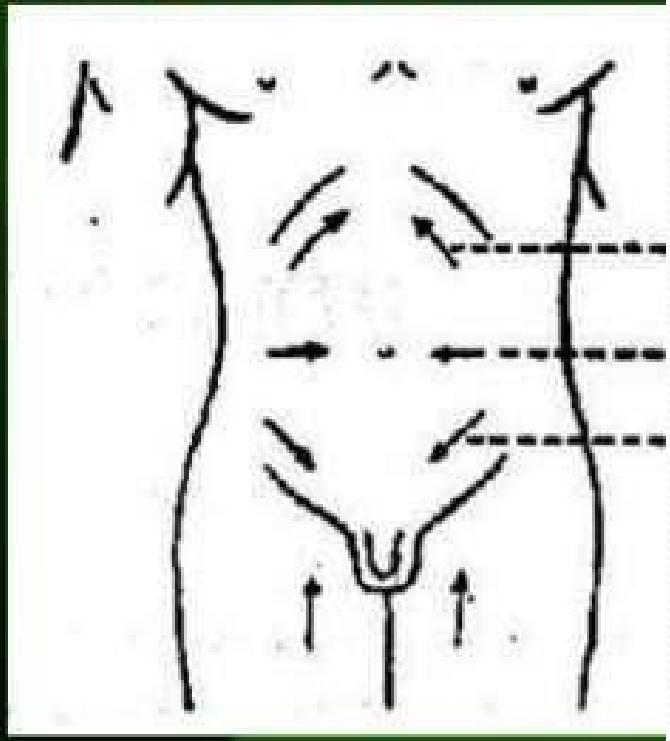
a. Plantar Response (S1-2)

- Run a blunt object (car key,orange stick) along the lateral border of the sale of the foot toward the little toe.

- Normal response is flexion of large toe and adduction of other toes.

b. Abdominal Reflexes (T8-12)

- The patient should be supine and relaxed.
- Use an orange stick and stroke briskly but lightly in a medical direction across the upper and lower quadrant of the abdomen.
- The normal response is contraction of the underlying muscle with the umbilicus moving laterally and up or down depending upon the quadrant tested.



Abnormalities

Plantar response -

Extension of large toe.

- Unequivalent sign of UMN damage.

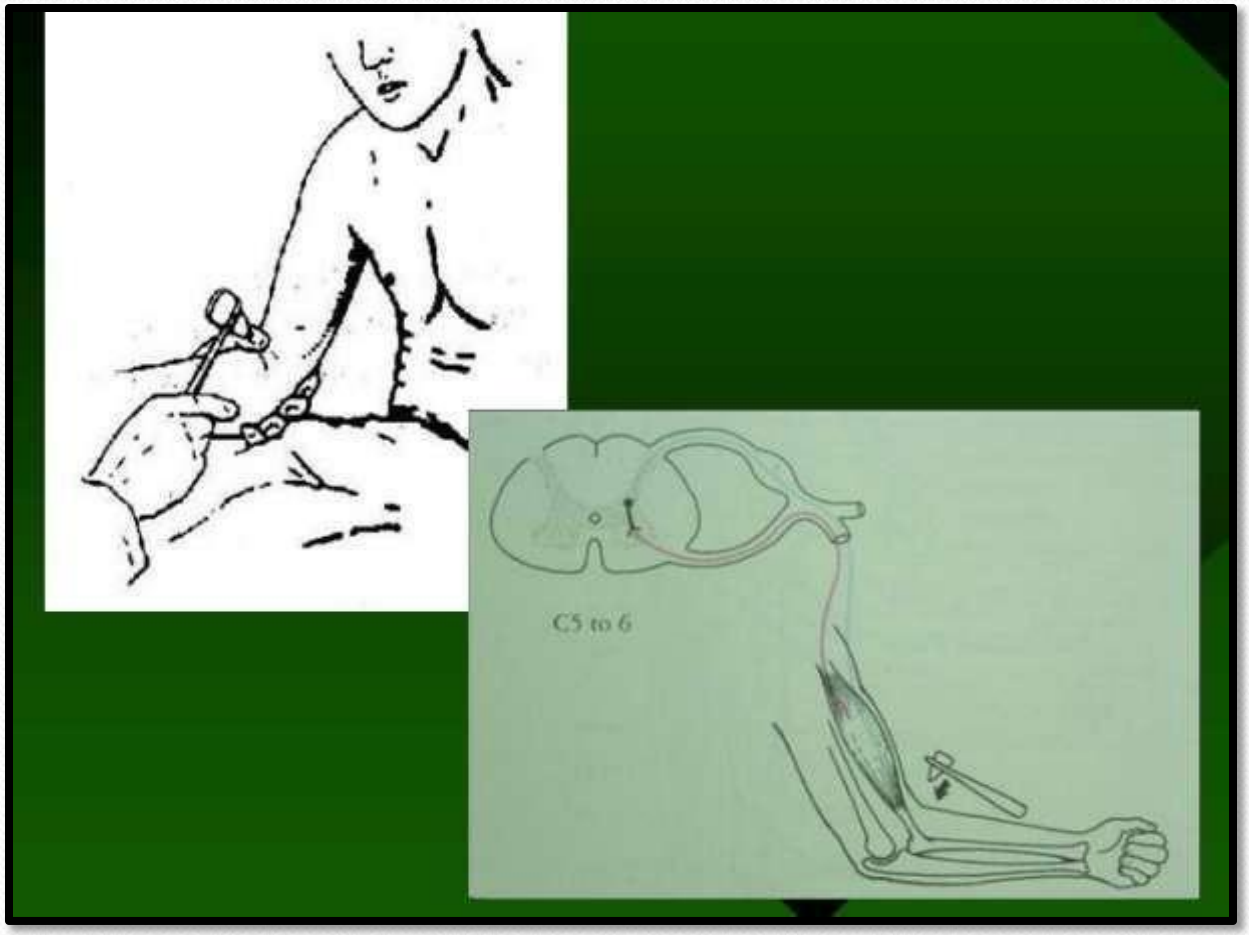
Abdominal reflexes -Lost in upper motor lesion

CREMASTERIC REFLEX(L1-2) :

- Abduct and externally rotate the patient's medial aspect of the thigh.
- Stick the upper medial aspect of the thigh.
- Normally the testicle on the side stimulated will rise briskly.
- Used to identify the level of spinal cord lesion after injury.

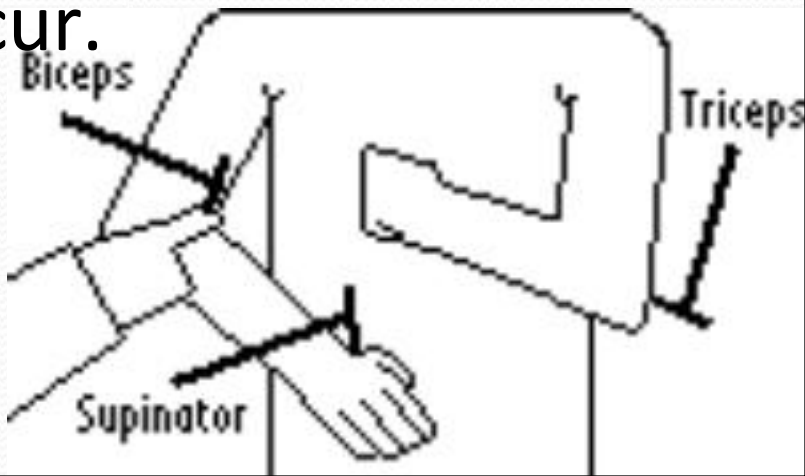
- **2. DEEP TENDON REFLEXES** :- Rapid muscle contraction response when deep receptors in the muscle or in the tendons are stimulated.
- **1. Hoffman's Reflex** : - The test involves tapping the nail or flicking the terminal phalanx of the middle or ring finger.
- A positive response is seen with flexion of the terminal phalanx of the thumb
- **2. Finger jerk** : - Place your middle and index fingers across the palmer surface of patient's proximal phalanges. - Observe the flexion of the patient's finger

Biceps jerk (C5-C6) - Flexion at the elbow leads to tension in the biceps tendon. In this position, strike is made



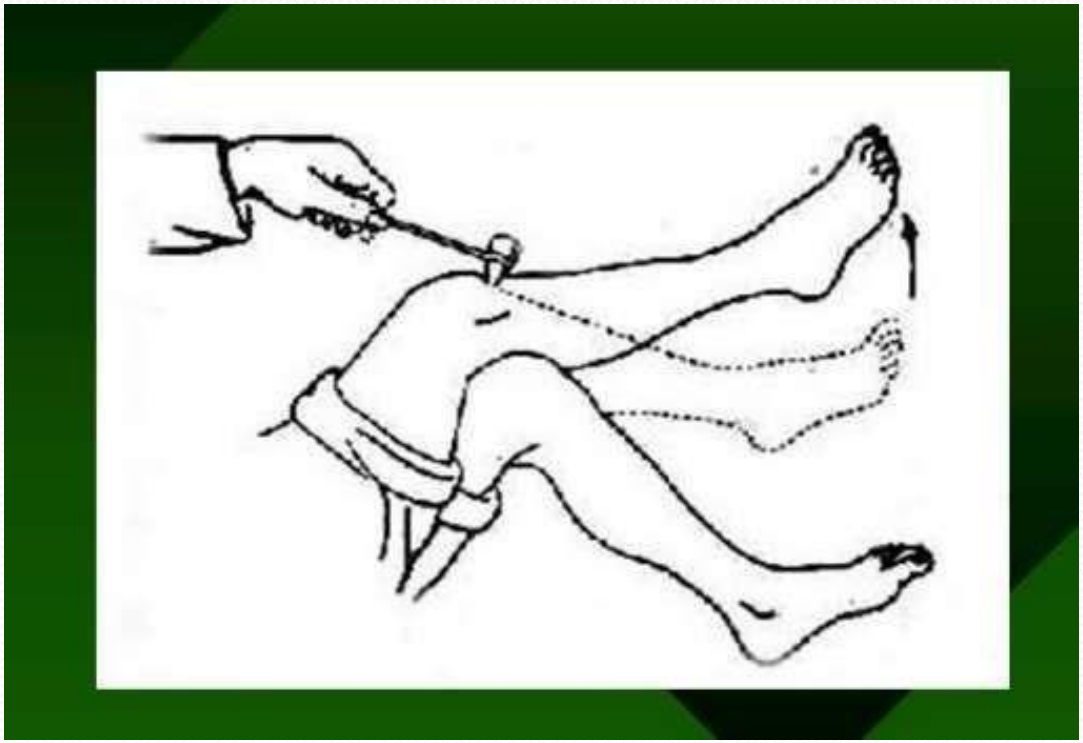
Supinator jerk: strike the lower end of the radius about 5 cm above the wrist

- Segmental innervation C 5-6
- Contraction of brachioradialis and flexion of the elbow
- The biceps often contracts as well slight flexion of the fingers may occur.

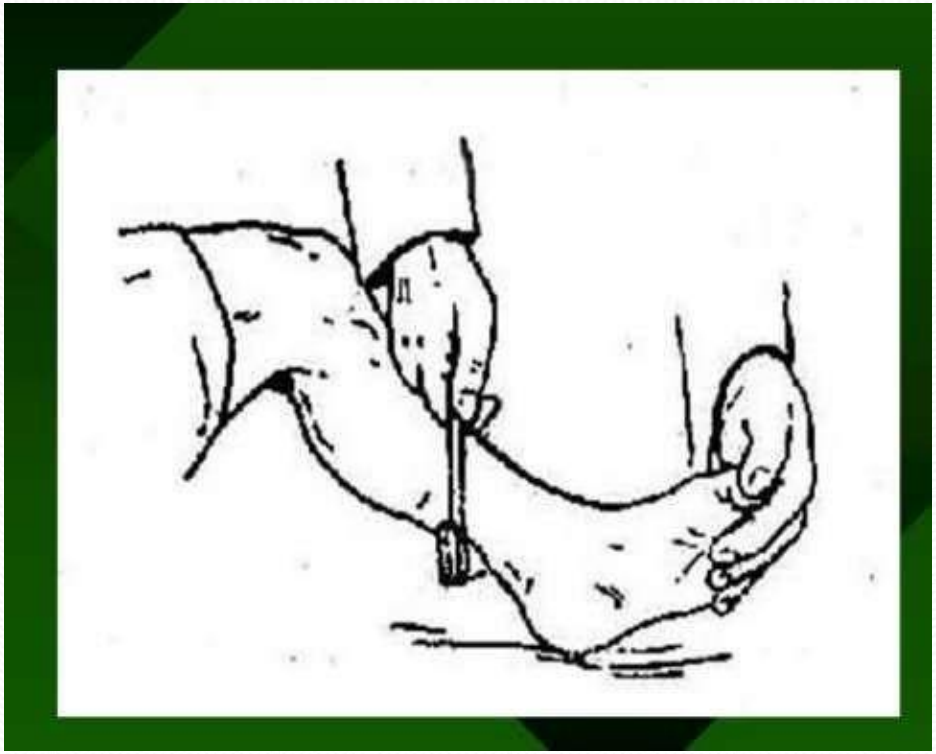


the elbow when the triceps tendon is strike

Extension at the knee when the patellar tendon is strike.



flexion at the foot a when Achilles tendon is strike



TESTING MOVEMENT AND POWER

Score	Description
0	Absent voluntary contraction
1	Feeble contractions that are unable to move a joint
2	Movement with gravity eliminated
3	Movement against gravity
4	Movement against partial resistance
5	Full strength

TABLE 27.1 The Medical Research Council Scale of Muscle Strength

0	No contraction
1	A flicker or trace of contraction
2	Active movement with gravity eliminated
3	Active movement against gravity
4-	Active movement against gravity and slight resistance
4	Active movement against gravity and moderate resistance
4+	Active movement against gravity and strong resistance
5	Normal power

- Paralysis : refers to weakness or loss of voluntary movement.

- 1)**Monoplegia**: a paralysis of one extremity only
- 2)**Paraplegia**:a symmetric paralysis of both extremities
- 3)**Quadriplegia** : a paralysis of all 4 extremities
- 4)**Hemiplegia**: a paralysis of one side of the body limited by the median line
- 5)**Crossed paralysis**: a paralysis of one or more ipsilateral cranial nerves and contralateral hemiplegia.

- Based on the location, paralysis may be classified as:
- 1)Neurogenic paralysis: caused by lesion of motor neurons or peripheral nerves
- 2)Myogenic paralysis: caused by muscular diseases

- The ultimate goal of strength testing is to decide whether there is true "neurogenic" weakness.
- To determine which muscles/movements are affected.
- Probably the most important decision is whether the weakness is due to damage to upper or lower motor neurons (UMN or LMN)

- UMN weakness is due to damage to the descending motor tracts (especially corticospinal)
- Anywhere in its course from the cerebral cortex through the brain stem and spinal cord.
- UMN weakness is typically associated with increased reflexes and a spastic type of increased tone.

- LMN weakness is due to damage of the anterior horn cells or their axons (found in the peripheral nerves and nerve roots).
- This results in decreased stretch reflexes in the affected muscles and decreased muscle tone.
- Additionally, atrophy usually becomes prominent after the first week or two.

The Neurological Examination
Motor Examination

	Upper Motor Neuron	Lower Motor Neuron
Strength	↓	↓
Tone	↑ Spasticity	↓ Hypotonia
DTR's	↑ Brisk DTR's	↓ Diminished or Absent DTR's
Plantar Responses	↑ Upgoing Toes	↓ Downgoing Toes
Atrophy/Fasiculations	None	+/-

Co-ordination:

Examination to detect complex movements smoothly and efficiently.

- a. Rebound phenomenon
- b. Finger-nose test
- c. Heel-shin test
- d. Rapid alternating movements

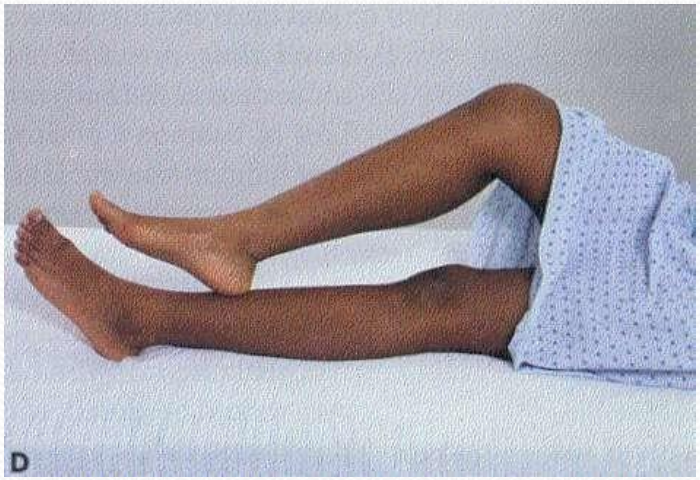
Apraxia: It is difficulty or inability to perform a motor action despite the patient understanding the task.

Rebound test: Ask the patient to flex at the elbow and resist you as you try to extend the arm.

- Place your other hand on the patients shoulder and turn the patient's headtoward the other direction, to shield the patient's face and eyes.
- Let the arm go suddenly.
- Arm returns to steadying position—normal.
- Arm oscillates several time then stays— abnormal rebound.

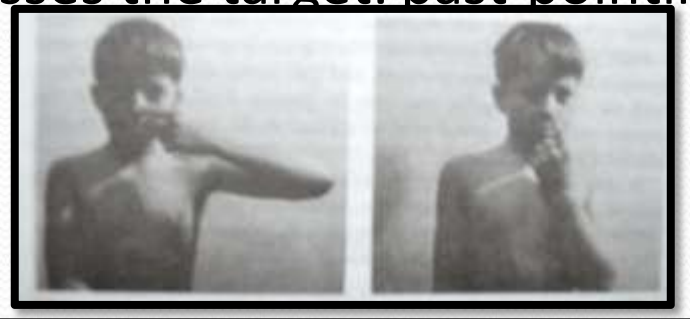
- **Rapid alternating movements** : Demonstrate to the patient (finger tapping, hand tapping, etc.), first in slow motion, and then faster.
- If the patient is able to do the task with normal rate and rhythm—normal.
- If movements are irregular, disorganized, dysrhythmic, uncoordinated—dysdiadochokinesia

- **Heel-to-shin test** : Done in the supine position.
- Ask the patient to lift one leg up and place the heel on the shin of the other leg, and then smoothly rub it along the shin down toward the toes.
- The test is abnormal if movement is irregular or the heel falls off the leg.



- **Finger-nose test** :
- Ask the patient to touch your finger with his or her index finger, then to the tip of the nose.
- You may move your target finger in different directions.

- Do one arm at a time.
- 1. Patient accurately performs the task: normal.
- 2. Patient develops tremor when approaching the target (your finger or his nose)—intention tremor: cerebellar disease.
- 3. Patient misses the target: past-pointing or dysmetria



Thank you